



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§ Notice of Allowance Date:
Umang Anand	§
Joseph Katz	§ Group Art Unit: 3723
§	
Assignee: The Johns Hopkins University	§
§	
Application No.: 10/010,663	§ Examiner: Dung V. Nguyen
§	
Batch No.:	§ Class-Subclass:
§	
Filed: December 6, 2001	§
§ Atty. Dkt. No.: JHUKA1	
For: Porous, Lubricated Mixing Tube	§
For Abrasive, Fluid Jet	§

DECLARATION UNDER 37 CFR 1.132

Assistant Commissioner for Patents
Washington, District of Columbia 20231

ATT: Examiner Dung V. Nguyen, Group 3723

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TECHNOLOGY CENTER R3700

Dear Sir:

I, Umang Anand, declare and say as follows:

1. I believe I am the original, first and joint inventor, along with Prof. Joseph Katz, of the subject matter which is claimed and for which a patent is sought on the invention which is the subject of the above referenced patent application.
2. In my opinion, I believe that it would be informative for Dung V. Nguyen, the Patent Examiner of record for the above referenced patent application, to better understand what those in the water jet cutting industry understand the differences to be between the cutting heads used in this industry: the abrasive water (or fluid) jet (AWJ), the subject of the above referenced patent application, and the abrasive water (or fluid) suspension jet (AWSJ), the subject of Prof. Katz's earlier U.S. Patent No. 5,921,846.

3. I hereby state that I am currently employed by the Department of Mechanical Engineering of The Johns Hopkins University, Baltimore, MD as a Postdoctoral Fellow.
4. I hereby state that I was awarded my Doctor of Philosophy degree from the Department of Mechanical Engineering of The Johns Hopkins University in 2002, and that the title of my doctoral dissertation was "Prevention of Nozzle Wear In Abrasive Water Suspension Jets (AWSJ) Using Porous Lubricated Nozzles."
5. I hereby state that I am including as part of this Declaration pages 5-16 of my doctoral dissertation. Pages 9-16 of this submission are especially pertinent because they explain the differences between an AWJ and an AWSJ. The information within these pages document that some of the major differences between these cutting heads include:

Structurally:

Figs. 1.1.4.3 (b)-(c) indicates that the major components of a AWSJ are an upstream slurry entry tube (not shown in its entirety) having an outlet to which is connected a nozzle or orifice, with the entry tube taking one of a variety of configurations (e.g., having a first port for receiving a pressurized, slurry mixture of water and abrasive particles and a second port for receiving a pressurized stream of water that serves to dilute the initial slurry) and serving to provide a flow length over which the abrasives particles within the slurry may be mixed so as to yield at the nozzle an essentially uniformly, premixed slurry of abrasives and water (see also FIG. 1A of Katz U.S. Patent No. 5,921,846).

Meanwhile, the major components of a AWJ are an orifice from which issues an initial high speed water jet, a not-totally-enclosed mixing & entrainment chamber which receives this flow of high speed water, an entry port in this chamber which allows dry abrasive particles to be entrained into the high speed water flow, an exit port from the chamber to which is connected a focusing or mixing tube that allows the slurry formed by the entrained abrasive particles and the high speed water flow to be thoroughly mixed, collimated and focused so that there issues from the mixing tube's exit a secondary, high speed water jet having entrained, abrasives particles.

Operationally:

A typical AWSJ, the subject of Prof. Katz's U.S. Patent No. 5,921,846, has considerable operational advantages over a typical AWJ, the subject of the above referenced patent application. These include:

- (a) AWSJs generally require less power consumption for the same cutting ability,
- (b) AWJs generally have to operate at higher pressures than AWSJs in order to be able to entrain sufficient quantities of abrasive particles so as to attain desired cutting powers,
- (c) Recycling of abrasive particles is easier with a AWSJ than with a AWJ because with AWSJs one is always dealing with slurries of abrasive particles and thus there is not need to totally dry the reclaimed abrasive particles as is required for the AWJ.

6. I hereby state that I have read and believe that I understand Examiner Nguyen's recent Office Action pertaining to the above referenced patent application.

7. I hereby state my opinion that the Examiner's §102(b) rejection of most of this application's claims, as anticipated by Prof. Katz's U.S. Patent No. 5,921,846, is unwarranted and unjustified, and probably due to the Examiner's apparent misunderstanding about the differences between AWJ and AWSJ cutting heads. For example, it is error for the Examiner to state, as he does on page 2 of the Office Action, that:

(a) the "upstream slurry entry tube or chamber" identified by numeral 2 in Katz's FIG. 1A of a AWSJ is equivalent to the not-totally-enclosed mixing & entrainment chamber of my AWJ, which I claim as "a chamber having an inlet for receiving a pressurized fluid jet, a port for receiving a flow of dry abrasive particles which are entrained into said fluid jet, and an exit through which said fluid jet and entrained abrasives exit said chamber," and identify by numeral 10 in FIG. 4 of the above referenced patent application, and

(b) the "nozzle or orifice" identified by numeral 7 in Katz's FIG. 1A of a AWSJ is equivalent to the focusing or mixing tube of my AWJ, which I claim as "a mixing tube having an entry port for receiving said fluid jet and entrained abrasives, an inner wall for directing the flow of said fluid jet and entrained abrasives, and an outlet port through which said fluid jet and entrained abrasives exit said tube, wherein said tube entry port is proximate said chamber exit," and identify by numeral 20 in FIG. 4 of the above referenced patent application.

With my above, clarification-intended remarks on this matter and the submission of the pertinent pages from my doctoral dissertation, I hope that I will be able to convince the Examiner of his errors (in interpreting Prof. Katz's U.S. Patent No. 5,921,846) such that he will consequently withdraw his above cited §102(b) rejections of my claims.

8. I hereby state my opinion that the Examiner's §103(b) rejection of this application's Claims 4, 5, 17, 18, 30, 31, 43 and 44, as being obvious over Prof. Katz's U.S. Patent No. 5,921,846, is unwarranted and unjustified since the ratio of lubricating fluid to carrier fluid kinematic viscosity being in the range of 100/1 - 40,000/1, and the ratio of the flow rate of lubricating fluid to that of an abrasive fluid jet being in the range of 1/10,000 - 1/20 are "not obvious numbers and routine skill in the art." The nonobviousness of these ratios is clearly seen in Fig. 24 and the discussion that appears on pages 176-179 of my paper entitled "Prevention of Nozzle Wear In Abrasive Water Suspension Jets (AWSJ) Using Porous Lubricated Nozzles" which was published in the ASME Journal of Tribology, vol. 125(1), pp. 168-180, January 2003, a copy of which is included with this Declaration. The text within these cited pages of this distinguished research journal clearly discloses my research findings that very high viscosity lubricants are required and indications are given of the range of lubricant flow rates required to prevent substantial nozzle erosion. Hence, such results cannot be obvious since they have require considerable amounts of both experimental and theoretical research.

9. I hereby state that I am including as part of this Declaration pages 66-79 of my doctoral dissertation. These pages pertain to the selection of a porous material from which a mixing tube can be fabricated and the selection of the optimal Electric Discharge Machining (EDM) operating parameters for the machining of the flow passage that connects the inlet and outlet ports of the mixing tube. These pages are being offered to further clarify these matters that were disclosed on pages 10-11 of the patent application. It is hope that this clarification will be helpful to the Examiner as he examines the amended Claims 13, 26, 39 and 52 that will be offered to overcome the Examiner's initial §103(b) over Katz in view of Massa et al. (U.S. Patent No. 6,425,805) rejection of these claims.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements

were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature:



Date: 04/25/03

Name:

Umang Anand

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CERTIFICATE OF MAILING

I hereby certify that this correspondence, and attachments, if any, will be deposited with United States Postal Service, First Class Mail, postage prepaid, on the date indicated above and will be addressed to the Assistant Commissioner for Patents, U.S. Patent & Trademark Office, P.O. Box 2327, Arlington, VA 22202, ATTN: Examiner Nguyen, Group 3723, wherein it is to be understood that this address is being used in place of that set forth in 37 CFR 1.1 on an emergency basis as directed in the USPTO's 1/20/01 directive on this matter.

Signature:



Date of Deposit: 4/30/03